TEXAS AGRICULTURAL EXPERIMENT STATION
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Cordova Barley

Figure 1. Wintex (left) and Cordova barley growing in field plot trials at Denton, 1952.

in cooperation with the
UNITED STATES DEPARTMENT OF AGRICULTURE

The TEXAS AGRICULTURAL AND MECHANICAL COLLEGE SYSTEM
GIBB GILCHRIST, Chancellor

DIGEST

This bulletin reports the development and characteristics of Cordova, a superior new barley variety for the Rolling Plains and Central Texas.

Cordova was developed in the cooperative small grain improvement program of the Texas Agricultural Experiment Station and the Division of Cereal Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture.

It was developed from a cross between the commercial varieties Texan and Wintex which are now seeded on most of the Texas barley acreage. The new variety combines the good characteristics of the two parents unusually well, including high yielding ability, high test weight, early maturity, ability to stand for combine harvesting, a smooth awn and resistance to some races of mildew and loose smut.

The average yields of Cordova are higher than either parent at all locations in the Rolling Plains and Central Texas. With a few exceptions, it has outyielded all commercial varieties at all locations. In several instances, the increased yield of Cordova is outstanding.

Cordova is susceptible to most of the leaf diseases of barley, with the exception of mildew. It should not be grown in South Texas where these leaf diseases are major factors in production. The variety is well adapted to use as a winter grazing crop, it tillers well and has the capacity for high yields under favorable conditions.

Since it is more likely to be damaged by low temperatures than true winter varieties such as Reno, Cordova should not be fall-sown in the Texas Panhandle.

Cordova Barley

I. M. Atkins*

BARLEY is a relatively minor crop in Texas at present but it offers promising possibilities as a combined grain and forage crop for much of the State. The maximum acreage ever devoted to barley in Texas was in 1944 when an estimated 340,000 acres were grown. The acreage has declined in recent years to a low of only 45,000 acres in 1951. This has been due to a series of dry fall seasons and otherwise unfavorable conditions for the crop.

Barley is scattered over the entire small grain area of Texas and three distinct types are grown. Only the most hardy fall-sown barleys can withstand the severe winter temperatures of the Texan Panhandle. In this area, spring-types are sown in March in seasons when spring moisture conditions are favorable. Winter temperatures are not so severe, but often more changeable, in the Rolling Plains and Central Texas areas and the intermediate winter types are grown there. These may be seeded either in the fall or in the spring, but most of the acreage is fall-sown and the crop is utilized for winter pasture as well as grain production. True spring-type barley varieties will usually survive from fall-seeding in South Texas but diseases are major factors in production. Only the new disease-resistant variety Goliad is recommended for this area.

A new variety, Cordova, is now available for the Rolling Plains and Central Texas as far south as Temple. Its greater yielding ability, high test weight, smooth awns and resistance to mildew should make it popular and serve to help restore the acreage formerly seeded to barley in Texas.

DEVELOPMENT

Cordova barley was developed from a cross between Texan and Wintex, the two varieties which now are seeded on most of the barley acreage in Texas. The popularity of Wintex has declined recently because of its high susceptibility to and resulting damage by mildew. The principal fault of Texan under farm production is its weak straw. The cross was made to combine the good characteristics of these two

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Table 1. Average yields of Cordova and seven commercial varieties of barley grown at several Texas locations, 1947-52, and in the USDA Winter Barley Nursery, 1949-52

Location	Number years tested	Variety						
		Yield of grain, bushels per acre						
		Cordova	Texan	Wintex	Tenkow	Ward	Reno	Tennessee Winter
Fall-sown at:								
Amarillo	2	39.9	33.2	32.7	31.9	25.5	22.7	26.1
Chillicothe	5	41.3	38.0	29.9	35.6	35.0	29.1	29.5
Iowa Park	5	47.1	44.8	45.4	49.0	49.2	47.6	42.6
Stephenville	4	44.7	34.6	34.8	33.5	29.8	29.0	27.2
Denton	6	36.2	32.3	27.2	30.1	27.5	25.5	24.9
Greenville	4	35.1	32.7	33.6	38.1	29.6	27.6	28.0
Temple	3	38.8	34.6	—	—	—	—	21.1
Comfort	3	40.5	37.3	—	—	—	—	—
Average[1]		40.7	35.9	33.9	36.5	32.8	30.3	29.7
USDA Reg. Nur.	2	39.3	35.7					
Spring-sown at:								
Amarillo	1	43.2	35.2	42.3				

[1]Average of six locations, data from Temple and Comfort omitted. The least significant difference between two varieties at the .05 percent level is 3.3 bushels.

adapted varieties. Dr. G. A. Wiebe, agronomist in charge of barley research for the U. S. Department of Agriculture, made the cross and grew the first generation plants before sending seed to Denton. The selection (8-43-311, C.I. 7576), which has now been named Cordova, was made at Denton in 1943. Early tests were so promising that the strain was included in all Texas yield trials as soon as seed was available.

YIELDS

Cordova has been included in yield trials at the Denton station for six seasons and at other Texas locations from two to five seasons. It has been tested from spring seeding only one season, this at Amarillo. The variety has been included in the regional Winter Barley Nursery of the U. S. Department of Agriculture since 1949. This uniform nursery of some 20 strains, grown by stations in states from New York to Texas, gives an opportunity to study a new strain under a wide range of conditions. Data on yields in these tests are presented in Table 1.

The performance of Cordova in comparison with present commercial varieties is outstanding at all Texas locations, as shown in Table 1. Its superiority appears to be greatest at Denton, Stephenville, Temple and Comfort. Tenkow has yielded slightly more than Cordova at Greenville and Iowa Park. At Denton, Cordova has outyielded Texan by an average of 3.9 bushels and Wintex by an average of 9.0 bushels per acre for a 6-year period. Wintex was damaged by mildew in several seasons during this testing period. In the Rolling Plains and Central Texas, the true winter-type varieties, Reno and Ward, have yielded less than Cordova, Texan or Wintex at most locations.

Eliminating the data from Temple and Comfort, where only part of the varieties were tested, the five-station average yield of Cordova is 40.7 bushels per acre, as compared with 35.9 bushels for Texan and 33.9 bushels for Wintex.

Only limited trials—two seasons from fall-seeding and one from spring-seeding—have been made at Amarillo, which is representative of the Panhandle. While Cordova has outyielded the other varieties during this period, it is known to be less cold resistant than Reno and Ward and probably will winter-kill some seasons. Additional tests will be made to determine its suitability for spring seeding in that area.

Cordova is shown in field plot trials at the Denton station in 1952 in Figure 1, on the cover.

Table 2. Agronomic data for Cordova and six commercial varieties of barley at Texas stations during the period 1947-52; and in the USDA Winter Barley Nursery, 1949-52

Item	Number station years	Variety						
		Cordova	Texan	Wintex	Tenkow	Ward	Reno	Tennessee Winter
Test weight, pounds:								
Texas stations	24	43.8	42.8	42.7	43.2	43.3	42.8	42.2
Regional tests	53	42.8	41.5					
Date headed:								
Texas stations	19	4-15	4-14	4-19	4-19	4-22	4-22	4-19
Regional tests	39	4-25	4-22					
Date ripe:								
Texas stations	12	5-20	5-21	5-22	5-22	5-22	5-22	5-21
Regional tests	5	5-27	5-29					
Plant height, inches								
Texas stations	10	22.6	23.8	23.1	24.9	24.6	24.1	23.2
Regional tests	34	32.0	33.0					
Lodging percent:								
Texas stations	2	34.6	40.5	36.0	42.5	32.0	37.0	40.0
Regional tests	24	11.0	20.8					
Leaf rust, percent:								
Texas stations	1	40	10	10	5	40	35	25
Regional tests	14	40	44					
Survival, percent:								
Texas stations	3	84	71	68	66	95	97	79
Regional tests[1]	42	46					76	44

[1]Data obtained in the USDA Barley Winter Hardiness Nursery.

AGRONOMIC CHARACTERISTICS

Summarized data on the agronomic characteristics of Cordova and six commercial varieties of barley grown at eight locations in Texas from 1947 to 1952 are given in Table 2. Data for the two varieties, Cordova and Texan, which were grown in the USDA Winter Barley Nursery, are presented in the same table.

Test Weight

Cordova averaged approximately one pound more per bushel in test weight than Wintex or Texan in 24 observations in Texas. In 53 tests in the regional nursery, it averaged 1.3 pounds more per bushel than Texan. This higher test weight may be an important factor in the higher yields of Cordova.

Maturity

The intermediate winter-type barley varieties, as a group, are earlier in maturity than the true winter-type varieties such as Reno. Texan headed 8 days earlier than Reno, Cordova was 7 days earlier and Wintex 3 days earlier in these tests. Differences in ripening are not as great as are differences in heading.

Lodging and Plant Height

Only limited observations on differences in lodging of varieties were possible during the testing period. In two tests, Cordova lodged less than Texan. In the regional tests, Cordova showed only 11.0 percent lodging, as compared with 20.8 percent for Texan, in the same tests. Cordova is slightly shorter than either parent, which may account for its greater resistance to lodging.

Survival

Winter-killing has not been an important factor in the barley tests in Texas in recent seasons. Only three observations of differential winter-killing were made. From regional tests of winter-hardiness, it is known that Cordova is less cold resistant than such hardy varieties as Reno, but it appears to be approximately as cold resistant as Tennessee Winter or either of it parents. It is considered sufficiently cold resistant for growing conditions in the Rolling Plains and Central Texas. It should not be fall-sown in the Texas Panhandle until further tests on its adaptation have been made.

Disease Reaction

The Wintex parent of Cordova is highly susceptible to mildew but Texan has been resistant to the disease during

the time it has been grown commercially in Texas. Cordova is similar to its Texan parent in this respect. However, races of mildew are known which can attack Texan and Cordova, and should these become established in Texas, these varieties will not continue to be resistant. Leaves of Wintex covered with mildew, in contrast with those of Cordova, are shown in Figure 2.

Observations on the occurrence of loose smut among the varieties in the regional nursery indicate that Cordova, like its Texan parent, is resistant to many races of loose smut. These observations were confirmed by artificial inoculations. However, this resistance does not lessen the need for seed treatment with recommended materials since other types of smut, stripe or other seed-borne diseases may be present on the seed.

Cordova is highly susceptible to leaf rust, stem rust, stripe and net blotch. The variety should not be grown in South Texas where these diseases are major factors in production.

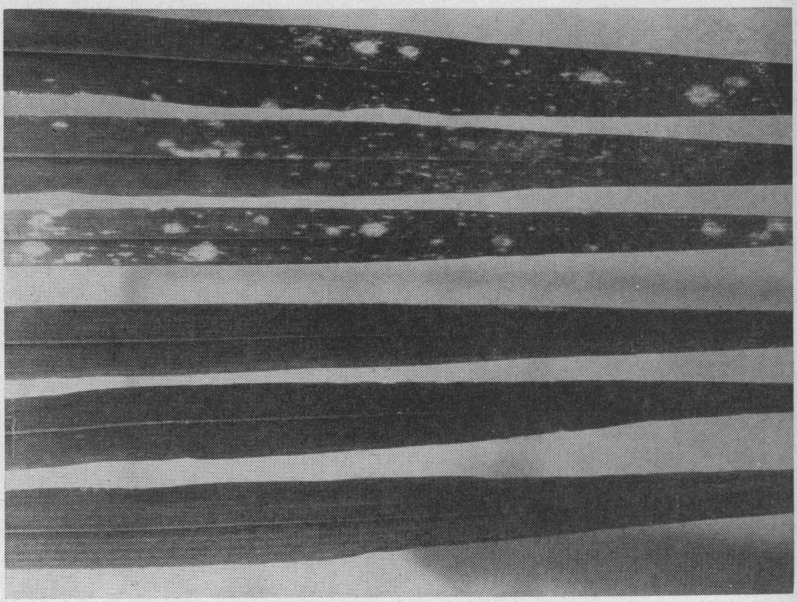

Figure 2. Leaves of Wintex barley, susceptible (top), and of Cordova, resistant to mildew (bottom).

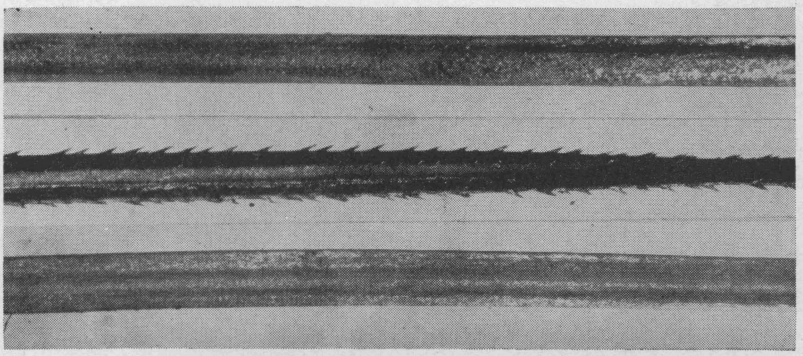

Figure 3. The awns of Cordova barley (top and bottom) are smooth in contrast with the rough, saw-toothed awns of Winter.

PLANT AND SEED CHARACTERISTICS

Cordova is a six-row, smooth-awn variety. Both the head and kernels are larger than most winter barley varieties. Seedling growth is rather upright, producing abundant forage for livestock within a few weeks after seeding in the fall. The variety tillers profusely and has the capacity for very high yields under favorable conditions. The smooth awns of Cordova, in contrast with the rough awns of Wintex, are shown in Figure 3.

ACKNOWLEDGMENTS

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